

## Research Article

# “Can patients learn how to reduce their shoulder dislocation?” A one-year follow-up of the randomized clinical trial between the Boss-Holzach-Matter self-assisted technique and the Spaso method

Francesc A Marcano-Fernández , Ferran Fillat-Gomà , Mariano Balaguer-Castro , Ona Ràfols-Perramon , Jorge Serrano-Sanz , Pere Torner

Department of Orthopedics, Parc Taulí Hospital Universitari, Institut d'Investigació i Innovació Parc Taulí I3Pti, Universitat Autònoma de Barcelona. Sabadell, Spain

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## ORCID iDs of the authors:

F.A.M.F. 0000-0001-5690-631X;  
F.F.G. 0000-0002-3506-5141;  
M.B.C. 0000-0003-3625-6887;  
O.R.P. 0000-0001-5877-4330;  
J.S.S. 0000-0002-4417-9984.  
P.T. 0000-0002-0168-4091

## ABSTRACT

**Objective:** The aim of this study was to assess the effectiveness and reproducibility of self-assisted Boss-Holzach-Matter (BHM) technique compared with the Spaso (Sp) method for shoulder dislocation.

**Methods:** We conducted a follow-up at 1 year from the randomization of 60 patients with shoulder dislocation enrolled in the study “Teaching patients to reduce a shoulder dislocation.” Half of these patients had been taught the self-assisted technique, whereas the other half had been treated by a physician’s manipulative maneuver for reduction. We surveyed all the enrolled patients to describe recurrence rates and reproducibility for both the techniques without supervision as well as the number of emergency visits.

**Results:** In total, 52 patients (age range: 18-44 years) answered the survey from the 60 patients enrolled in the study. The total rate of recurrence was 38.5% (20 patients). For the Sp group, 4 of the 30 patients were lost. There were 9 recurrent patients (30%), and 7 were treated in the emergency department (ED). For the BHM group, 4 of the 30 patients were lost. There were 11 recurrent patients (37%), and 2 were treated in the ED. The difference in self-reduction rates and ED visits for both the groups was statistically significant ( $p=0.025$ ).

**Conclusion:** Teaching the BHM technique to the patients is effective and reproducible without direct supervision. It can decrease the number of visits to the ED and is a valid option to teach the patients at risk of recurrence when not being able to get immediate help.

**Level of Evidence:** Level I, Therapeutic study

## Introduction

Anterior shoulder dislocation is among the most common joint dislocations treated in the emergency department (ED) (1, 2). Epidemiological studies published in the United States cite an incidence of 11.2–23.9 per 100,000 person-years (3). There are many techniques described to treat a dislocation (4); however, there are few techniques that the patient can apply to herself or himself without the need of a professional. The availability and education of self-reduction techniques is of significant importance in shoulder dislocation because of 2 distinctive characteristics. First, there is a high rate of recurrence of this type of injury, especially in the young population [overall recurrence is 90% in those under 20 years of age and 70% in the 21-30 years age group (5)]. Second, many cases of shoulder dislocation occur in remote areas while practicing sports and situations where medical personnel might not be available for initial care and treatment (6). This is important because it has been observed that delays to the first reduction attempts are associated with a lower reduction success rate for shoulder dislocations (7).

We conducted a study titled “Teaching patients how to reduce a shoulder dislocation” (8), where we com-

pared the Spaso (Sp) technique (9) performed by a physician with the self-assisted Boss-Holzach-Matter (BHM) technique (10) that patients were taught to perform to themselves. This study was carried out in a controlled environment. A total of 60 patients with acute anterior shoulder dislocation treated in the ED of our institution were randomized into 1 of 2 groups (Sp or BHM), and pain, success rate, and reduction time were measured and analyzed.

The results obtained showed that the self-assisted BHM technique was less painful and just as effective and time consuming as the one performed by the physician.

Despite these results, no previous study has explored the reproducibility of the BHM or any other shoulder reduction technique without supervision.

We conducted a follow-up by means of a survey with patients included in the study 1 year after enrollment. We analyzed the recurrence rate and effectiveness of the self-assisted technique without supervision as well as the need for medical attention to validate the reproducibility of the technique.

We anticipated that the self-assisted maneuver is a reproducible technique in an out-of-hospital scenario.

**Corresponding Author:**  
Francesc A Marcano-Fernández  
francescmarcano@gmail.com



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## Materials and Methods

We conducted a retrospective observational study over the cohort of patients who had previously been randomized into the study. We carried out a telephone survey with all 60 patients who had participated in the study a year after inclusion. The study population included 30 patients who had been taught the BHM self-assisted technique a year before and 30 patients who had been treated by using the Spaso (Sp) technique as a method of reduction. The patients were asked the following questions:

1. Have you experienced a new episode of shoulder dislocation during the first year after inclusion to the study?
2. How many times have you had a dislocation during this first year?
3. Have you been able to reduce the dislocation by yourself?
4. Have you required medical attention to reduce the dislocation?
5. Have you required definite surgical treatment for this instability?

A member of the research department blinded to the allocation treatment conducted the telephone survey and gathered this information. This information was validated from the clinical records whenever the patient had attended the ED. The collected data were then given to an independent analyst ensuring observer-blinding of the results. We expected a low number of patients with recurrence, so a statistical analysis was considered to be underpowered and a descriptive analysis of the results was performed. We did, however, run the Fisher's exact test to compare the need for medical attention between both the maneuvers in case of recurrence and study their self-reduction success rate without medical supervision.

All the patients had previously signed a consent form to participate in the trial and to be contacted for further follow-up. The study had received the institutional review board approval (CSPTCOT201501), and the protocol was registered at the US National Institutes of Health (clinicaltrials.gov) with identifier: #NCT02527603.

## Results

Out of the 60 patients who had previously participated, 52 answered the survey; 8 patients did not respond after at least 3 attempts to contact via telephone and mail.

Moreover, 20 (38.5%) patients had one or more dislocation episodes during the first year after inclusion in the study. The average of recurrent episodes was 1.5, with 12 patients having only 1 more episode, 6 having 2 episodes, and 2 patients describing 3 recurrent episodes. In total, 11 (55.0%) of these 20 patients were able to reduce the recurrent dislocation by means of the self-assisted maneuver, whereas the

**Table 1.** First year follow-up characteristics for the Spaso (Sp) and the Boss-Holzach-Matter (BHM) groups

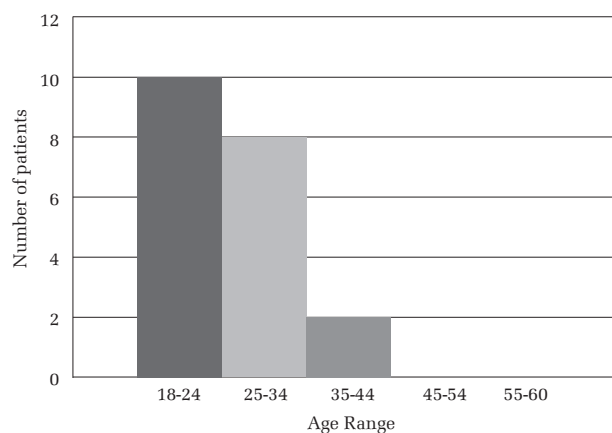
Survey completion	Total n=52	Spaso (Sp) n=26	Boss-Holzach-Matter (BHM) n=26
Recurrent dislocation (%)	20 (38.5)	9 (34.6)	11 (42.3)
First episode day of enrollment <sup>1</sup>	7 (35)	3 (33.3)	4 (36.4)
At least one new recurrent episode	12	5	7
Two recurrent episodes	6	2	4
Three recurrent episodes	2	2	0
Successful Self-Reduction (%) <sup>2</sup>	11 (55)	2 (22.2)	9 (81.8) (p=0.025) <sup>4</sup>
E.D. visits <sup>3</sup> (%) <sup>3</sup>	9 (45)	7 (77.8)	2 (18.2) (p=0.025) <sup>4</sup>
Definitive treatment (%)	5 (9.6)	3 (11.5)	2 (7.7)

<sup>1</sup>Number of patients who had their first dislocation the day of enrollment to the original study

<sup>2</sup>Percentage of recurrent patients

<sup>3</sup>Dislocations that required a visit to the emergency department for reduction

<sup>4</sup>Fisher's Exact test Comparing self-reduction success and ER visit for both groups



**Figure 1.** Bar graph showing the distribution of shoulder dislocation recurrence among different age groups

other 9 (45.0%) needed medical assistance for the reduction. This difference in self-reduction rate was analyzed by means of the Fisher's exact test and was found to be statistically significant (p=0.025). Furthermore, 5 patients (9.6%) had received definite surgical treatment for this instability during the first year after enrolment.

Out of the 20 patients who had had a new episode during the first year after enrollment to the original study, 13 (65.0%) had recurrent dislocations at the time of enrollment, and in 7 patients (35.0%), the day of enrollment was their first episode.

The results obtained for each group independently can be seen in Table 1. Figure 1 depicts the incidence of recurrence for each age group in the study.

## Discussion

Shoulder dislocation continues to be a prevalent motive of referral to the ED. Its high recurrence affects mainly young people (11), as can be seen from Figure 1. The recurrence rate observed in our study is similar to the rates described in previous epidemiological studies (3, 12).

When we compare both the groups, we can see that although recurrence is similar among the 2 groups, the number of emergency visits is lower for the BHM group. This could be owing to the fact that the patients who were initially taught the self-assisted technique were capable of reproducing the technique and accomplishing reduction immediately after dislocation. The 2 patients from the Sp group who

## HIGHLIGHTS

- This study assesses the reproducibility in real-live situations of one of these self-assisted techniques, the Boss-Holzach-Matter.
- We retrospectively analyzed for a year a cohort of 60 patients with previous known dislocations. 30 patients had been taught the self-assisted technique and the other 30 had not.
- The study shows that of those who had learned the technique, 81.8% successfully self-reduce their dislocation while only 22.2% of the patients who were not taught has a successful self-reduction.

did not require medical assistance for reduction explained that they managed to reduce their dislocation by means of the self-assisted technique just from the information that they were given about the BHM technique on the day of enrollment, without previous practice.

Furthermore, 2 patients from the self-assisted group could not reduce their dislocation. This percentage of success is similar to that observed in the original study (8).

The number of patients who had recurrent dislocations at enrollment is similar in both the groups, which can be seen in Table 1. Hence, the difference in the success rate of unsupervised reduction cannot be attributed only to the number of previous dislocations.

Of all the self-assisted techniques described in the literature (13-16), only 1 (13) took into account reproducibility of the technique after a year with rates of success similar to our results. No other technique has been analyzed in out-of-hospital scenarios.

At the 1-year time mark, only 5 of 52 patients underwent glenohumeral stabilization, which raises the following question: Are we undermining the need for stabilization by teaching the patients how to manage an acute dislocation without medical assistance?

We recommend, therefore, that the self-assisted technique be taught and implemented only as a tool for patients at risk of recurrence to manage an acute dislocation, hence avoiding the pain and time consumption of an ED visit. This technique should not be used as a definitive solution to an instability issue, and a thorough follow-up should be advised in recurrent cases.

It should be noted, however, that there are many limitations to this retrospective cohort. There is an important percentage of loss to follow-up (13% of surveys not answered). Recurrence is based on multiple factors, including age, mechanism, bone loss, and laxity, that were not addressed in the analysis. The number of recurrent episodes was difficult to assess because of recall bias. Although visits to the ED were validated from clinical records when patients were incapable of self-reducing their dislocation, there is no way of validating whether this was a true dislocation or only a subluxation or instability event. Finally, but not the least, the small sample size of recurrences obtained from an already small sample from the original study underpowers the statistical analysis performed. Despite these limitations, the objective of this study was to describe the reproducibility of the self-assisted BHM method in an unsupervised scenario for the patients included in the original study. It is not the purpose of this study to conclude on the prognostic factors of recurrence and its final solution.

In conclusion, the findings of this study support the use of the BHM technique for the reduction of anterior shoulder dislocations as an effective maneuver that is reproducible by the patients without supervision and can reduce unnecessary ED visits by teaching the patients how to reduce their shoulder dislocations “like a Boss” (17). We can, therefore, conclude that the patients have learned to reduce their shoulder dislocation.

**Ethics Committee Approval:** The study received institutional review board approval (CSPTCOT201501) and the protocol was registered at the US National Institutes of Health (clinicaltrials.gov) with identifier: #NCT02527603.

**Informed Consent:** Informed consent was obtained from all the individual participants included in the study.

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